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**DETAILED DESCRIPTION**

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[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the manufacture approach of the lusterless coated paper for printing by elevated-temperature calendering.

[0002]

[Description of the Prior Art] In recent years, visualization of a print progressed, the demand to a print sheet is also diversified, diversification of demand quality is seen in respect of quality, this brings about fragmentation of grade and a quality demand is becoming severe every year.

Quality improvement of coated paper and visualization of a print have come to be desired in the coated paper for printing still more strongly.

[0003] Although it is dim, a front face is smooth and the needs of lusterless coated paper which were excellent in ink acceptance nature have increased, and it is broadly used for mainly high-class fine-arts printing, the catalog, the pamphlet, the calender, the commercial publication text form, etc.

[0004] the print called a mat tone among lusterless coated paper -- a blank paper side, a monochrome printing side, and a process-printing side -- all have low gloss and the whole surface gives the feeling of \*\* and tactile feeling which were gently carried out in the flat. On the other hand, although the gloss of a blank paper side is not required, a certain amount of [ a printing side ] gloss may be desired. That is, the part of an alphabetic character is made into a low gloss, and is made readable, and the streak section has the needs of the print which was rich in contrast by making it look nice by gloss. It is called the dull tone to match this. There is a thing of a dull tone in the medium of a mat tone and a gross tone, generally blank paper glossiness is higher than a mat tone a little, and stamp face glossiness is lower than the thing of a gross tone a little. In the commercial scene of our country, since the mat and the dull property difference are recognized as a property of each brand, both are not clearly identified as a different form. Moreover, many things called a semi dull tone as medium of a mat tone and a dull tone are also produced commercially. Lusterless coated paper is decent as compared with the gross tone coated paper which has high gloss, and in order to brew a high-class feeling, recently, the cases used instead of the thing of the conventional gross tone are also increasing in number.

[0005] In recent years, a light thing has come to be liked from what also has profound books reflecting amendment of postage etc. Paper has also been asked for lightweight-ization in connection with this. Moreover, also when utilizing effectively the paper pulp manufactured from forest resources in connection with a rise of an environmental protection tendency, Kami's

lightweight-ization is the problem which cannot be bypassed and is in the inclination of lightweight-izing also in the field of lusterless coated paper.

[0006] Generally, in order to stop blank paper glossiness, as compared with usual gross tone coated paper, by various coaters, lusterless coated paper carries out coating of the coating constituent which contained the calcium carbonate so much, and produces it commercially as it is, or produces commercially by performing slight calender processing.

[0007] When lightweight-ization is tried based on the manufacture approach of conventional lusterless coated paper, opacity is low and lacks in stiffness. Moreover, since it cannot but stop also decreasing the amount of coating with the reduction in basis weight, when lusterless coated paper is produced based on a Prior art, stamp face glossiness also falls.

[0008] In order to raise opacity generally and to make paper upright, it is necessary to make paper bulky. As the approach of the reduction in the consistency of paper, examination of the paper pulp which is the main raw material of paper is raised. Generally wood pulp is used for paper pulp. The mechanical pulp of fiber manufactured by not using a chemical but mashing timber by the refiner or the grinder is more nearly upright, and it is more advantageous to the reduction in a consistency than the chemical pulp which extracted with chemicals the lignin which is a charge of reinforcing materials in fiber as pulp for the reduction in a consistency. The grand pulp (GP) of the contribution to the reduction in a consistency is large also in it. Usually, although paper pulp makes fiber flexible and fibrillates it by beating processing, low consistency-ization is opposite processing, and in order for it to be low consistency-ization not to carry out as much as possible, it is desirable [ beating processing ].

[0009] Also by selection of pulping tree species, the consistency of paper is influenced greatly. Namely, the one where timber fiber itself is bigger and rougher is possible for the reduction in a consistency. For example, in hardwood, gum wood, MEPURU, a birch, etc. are raised as tree species in which the reduction in a consistency is comparatively possible. However, especially in a rise of a current environmental protection tendency, it is difficult to specify only these tree species, and to collect cargo and pulp.

[0010] The increase of combination of recycled pulp is demanded from a rise of an environmental protection tendency in recent years and the need for resource protection. recycled pulp -- the quality of paper, such as paper of fine quality, a newspaper, a journal, a throwaway, and coated paper, -- since it is pulped while it was few and had been mixed when it classifies clearly and is pulped from a top, as compared with virgin mechanical pulp, a consistency tends to become high as a property of pulp. It is raised as this reason that the amount of [ of recycled pulp ] fiber is the mixture of chemical pulp and mechanical pulp. Moreover, the talc generally used, a kaolin, and clay tend to make a consistency high by the combination as a part for the loading material contained in Kaminaka, and a pigment component of coated paper. Thus, the increase of combination of recycled pulp tends to make a form consistency high.

[0011] As mentioned above, manufacture of the lusterless coated paper which opacity and stiffness do not have at sufficient thing when only pulp is changed based on the conventional technique and a lusterless coating stencil is milled, and was lightweight-ized only by this technique is difficult.

[0012] It is better not to perform calender processing performed in order to give smooth nature to making press \*\* low as much as possible in the press stroke at the time of paper milling, and Kami's front face as examination of the reduction in a consistency at the time of paper milling.

[0013] Examination for the loading material subsequently to pulp blended to the coating stencil is performed besides the device at the time of such pulping and paper milling. [ many ] For

example, the method of attaining low consistency-ization is indicated by JP,52-118116,B by blending the capsule of the synthetic organic substance in the air as a part for a loading material. Moreover, the synthetic organic fizz loading material (for example, a trade name: EXPANSEL, product made from Japanese FIRAITO, Inc.) which attains low consistency-ization is also proposed by making it expand with the heat in the dryer section at the time of paper making. However, even if the desiccation conditions at the time of paper making are difficult, and it carries out coating of the coating liquid to this coating stencil and manufactures lusterless coated paper by the approach using these synthetic organic fizz loading materials, manufacture of lusterless coated paper excellent in a low consistency and stamp face glossiness is difficult. [0014] With diversification of a printing method, the demand to a print sheet also becomes high and various techniques are developed in connection with it. Also in the calendering approach, instead of the conventional super calender, many approaches by the elevated-temperature calender are proposed, and although it is reported that stamp face glossiness, opacity, stiffness, etc. improve relatively with improvement in the speed of a finishing rate, when only this technique changes \*\* and mills lusterless coated paper, it is difficult [ it ] not to become a low consistency but to solve a technical problem.

[0015]

[Problem(s) to be Solved by the Invention] The technical problem of this invention has a low consistency and high stamp face glossiness, and is to offer the approach of manufacturing efficiently lusterless coated paper excellent in surface reinforcement.

[0016]

[Means for Solving the Problem] this invention person etc. consists of paper pulp and a loading material, as a result of inquiring wholeheartedly, in order to solve the above-mentioned technical problem. Amorphism silicate is contained 12 or less % of the weight 2 % of the weight [ per Shigekazu Kami ] or more as a loading material. By processing the coated paper with which the pigment coating layer was prepared on the stencil which contained mechanical pulp 10% of the weight or more as paper pulp in the software calender whose temperature of a rigid roll is 150 degrees C or more It came to complete a header and this invention for lusterless coated paper excellent in a low consistency and stamp face glossiness being obtained.

[0017] As a loading material, it becomes possible by containing amorphism silicate 12 or less % of the weight 2 % of the weight [ per Shigekazu Kami ] or more to obtain a low consistency coating stencil. When amorphism silicate is blended less than 2% of the weight and lusterless coated paper is manufactured as a loading material using a stencil, a coating stencil does not become a low consistency, and even if it optimizes pulp combination, calender conditions, etc., the lusterless coated paper of a low consistency and high stamp face glossiness cannot be obtained. When more loadings of amorphism silicate than 12 % of the weight are blended, the number of the particles per unit weight increases, and since the probability for association between fiber to be checked becomes high, fixed surface reinforcement cannot be maintained after surface coating. Moreover, as for the relative bulk density of amorphism silicate, it is desirable preferably that it is 0.2-0.8g/ml. When relative bulk density uses the less than 0.2g [ml] coating stencil which carries out amorphism silicate content, the surface reinforcement of coated paper itself falls. When relative bulk density uses the coating stencil which exceeds ml in 0.8g /and which carries out amorphism silicate content, it is difficult for the consistency of a coated paper stencil and coated paper itself to become high, and to obtain bulky coated paper. Furthermore, as for the relative bulk density of amorphism silicate, it is desirable preferably that it is to 0.8g/ml exceeding 0.3.

[0018] It is required to contain mechanical pulp 10% of the weight or more as paper pulp. By using the thing of this range, it becomes possible to obtain a low consistency coating stencil. It is difficult to obtain enough bulky stencils, when mechanical pulp is blended less than 10% of the weight, when a loading material, calender conditions, etc. are optimized, it is bulky, and high opacity and lusterless coated paper excellent in upright and stamp face glossiness cannot be obtained. About calender processing, it is required to carry out in the elevated-temperature software calender which consists of an elastic roll and a metal roll heated at 150 degrees C or more. Although a metal roll is low nip pressure or the short residence time and can carry out data smoothing of a stencil or the coating layer so that temperature is high if the content moisture of coated paper is suitable, this effectiveness cannot be acquired at less than 150 degrees C. Since a calender pressure is made low, high-speed processing can be carried out and the residence time can be shortened when it is going to obtain blank paper glossiness comparable as being obtained using the conventional supercalender, and stamp face glossiness by elevated-temperature software calender processing, the consistency of a coating layer and a stencil becomes low, opacity improves and stiffness becomes high. Moreover, processing speed is quicker than the conventional supercalender processing, and since a frame substitute of winding etc. is omissible, it can produce efficiently and excels in operability.

[0019]

[Embodiment of the Invention] Hereafter, this invention is explained to a detail.

[0020] The amorphism silicate used as a loading material in this invention has hydrated Al silicates, hydrated-Al-silicates soda, a water calcium silicate, a water magnesium silicate, etc. that what is necessary is just an insoluble silicate. Moreover, other loading materials, such as talc other than amorphism silicate, a kaolin, whiting, precipitated calcium carbonate, and titanium oxide, may be mixed.

[0021] Usual mechanical pulp, such as grand pulp (GP), chemiground pulp, refiner grand pulp (RGP), and a thermomechanical pulp (TMP), can be used for the mechanical pulp used in this invention, and the recovery recycled pulp obtained from newspaper used paper is also contained. Moreover, the loadings of mechanical pulp may be 100 % of the weight per pulp weight.

[0022] Which thing of the stencil which carried out paper making using the long network machine which is not limited especially about the paper-making approach of a stencil, and contains a top wire etc., the round mesh machine, the machine which used two persons together, the Yankee dryer machine, etc. by acid paper making, neutral paper making, and the alkaline paper-making method may be used. A nature stencil can also be used while the recovery recycled pulp obtained from newspaper used paper is included. Moreover, size press, BIRUBUREDO, a gate roll coater, and pre meta ring size press are used, and the stencil which carried out reserve coating of starch, the polyvinyl alcohol, etc., and the coating stencil which carried out reserve coating of the coating liquid containing a pigment and adhesives above further can also be used. The basis weight used for common coated paper as a coating stencil is 30 - 400 g/m<sup>2</sup>. Although what is extent can be used suitably, for this invention, basis weight is 60 g/m<sup>2</sup>. They are 50 g/m<sup>2</sup> especially preferably hereafter. Effectiveness is large when the following carries out a thing activity. It is organic pigments, such as inorganic pigments, such as the kaolin and clay which especially a limit does not have in the pigment used for a coating layer by this invention, and are used for coated paper from the former, delaminated clay, whiting, precipitated calcium carbonate, talc, a titanium dioxide, a barium sulfate, a calcium sulfate, a zinc oxide, a silicic acid, a silicate, colloidal silica, and a satin white, and a plastics pigment, and these pigments can be used by independent or two or more sort mixing if needed.

[0023] There is especially no limit in the adhesives used in this invention, and are used for coated paper from the former. A styrene butadiene system, styrene acrylic, ethylene and a vinyl acetate system, Various copolymerization and polyvinyl alcohol, such as a butadiene methyl methacrylate system and a vinyl acetate butyl acrylate system, Synthetic system adhesives, such as a maleic-anhydride copolymer, and an acrylic acid, a methyl methacrylate system copolymer; Casein, Protein, such as soybean protein and synthetic protein; Oxidized starch, electropositive starch, urea phosphorylation starch, Starch, such as etherification starch, such as hydroxy ethyl ether-ized starch, and a dextrin; they are used by one or more kinds of usual adhesives for coated paper, such as cellulose, such as a carboxymethyl cellulose, hydroxyethyl cellulose, and a hydroxymethyl cellulose, choosing suitably. these adhesives -- per [ 5 ] pigment 100 weight section - 50 weight sections -- it is more preferably used in the range of 10 - 30 weight section extent. Moreover, various assistants blended with the usual pigment for coated paper, such as a dispersant, a thickener, a water retention agent, a defoaming agent, a deck-watertight-luminaire-ized agent, and a coloring agent, are used suitably if needed.

[0024] The adjusted coating liquid carries out double-sided (or one side) coating of one layer or more than a bilayer on a stencil using a blade coating machine, a bar coating machine, a roll coater, an air knife coating machine, a reverse roll coater, a curtain coating machine, a size press coating machine, a gate roll coater, etc. About the amount of coating, it is 2 - 15 g/m<sup>2</sup> at solid content per one side. It is desirable.

[0025] as an approach of drying a humid coating layer, various kinds of approaches, such as a steamy overheating cylinder, a heating hot blast air dryer, a gas-heater dryer, an electric heater dryer, and an infrared heater dryer, are independent, for example -- or it is used together and used.

[0026] In this invention, after carrying out coating desiccation of the coating liquid at the coating stencil mentioned above, calender processing is carried out, using as 150 degrees C or more metal roll temperature of the software calender with which a degree of hardness consists of combination of a high elastic roll and a metal roll. Not only temperature but the nip residence time is important for such an elevated-temperature software nip calender. In operation actual from this point, it is the roll nominal diameter of 300mm or more, and the Shore D degrees of hardness 80-100 (preferably 85-95) of an elastic roll, and when it converts into the roll nominal diameter of 500mm, it is 400-3000ma part for /, and the linear pressure 30 - 500 kg/cm in \*\*\*\* rate, and 5 - 8% of before [ a calender ] coated paper moisture, and it is desirable to process by 2 or more nips of calender nip numbers. In addition, a roll nominal diameter -- A.V.Lyons \*\* -- the following formula showed (1990 TAPPI Finishing and Converting, P5) Roll nominal diameter (equivalent diameter) It points out.

(Roll nominal diameter) = (diameter of software roll) x (diameter of chilled roll) / { (diameter of a software roll) + (diameter of a chilled roll) }

[0027]

[Example] Although an example is raised to below and this invention is explained more concretely, of course, it is not limited to these examples. In addition, unless it refuses especially, the section in an example and % show weight section and weight %, respectively. In addition, it examined based on the appraisal method as shown below about the obtained lusterless coated paper.

[0028] (1) Blank paper glossiness : JIS P It measured based on 8142.

[0029] (2) Stamp face glossiness : it is JIS using a RI-II mold printing tester about the front face of the print which printed 0.30 cc using the sheet process ink (trade name TK yes, echo red MZ) by TOYO INK MFG. CO., LTD., and was obtained after neglect one whole day and night. P It

measured based on 8142.

[0030] (3) Consistency : JIS P It measured based on 8118.

[0031] (4) Surface reinforcement : after printing 0.40 cc using the special ink (trade name SMX tuck grade 15) by TOYO INK MFG. CO., LTD. using a RI-II mold printing tester, flesh-side picking was performed, it peeled off and visual assessment of the condition was carried out on the following criteria.

[0032] O : -- very -- fitness, O:fitness, and \*\*: -- a little inferior basis weight 44 g/m<sup>2</sup> which contains talc for hydrated-Al-silicates soda (relative bulk density 0.4g/ml) 6% of the weight 4% of the weight per Shigekazu Kami as a x:inferior [example 1] loading material, and contains mechanical pulp 30% of the weight as paper pulp The report grade paper was used as a coating stencil.

[0033] Next, the sodium-polyacrylate 0.2 section was added to the pigment which consists of the particle kaolin ( AMAZON88 made from KADAMU) 25 section, the 2nd class kaolin (Huber high DORAPASU) 30 section, and the particle whiting (FIMATEC, LTD. make FMT-90) 45 section with the pair pigment as a dispersant, the SERIE mixer distributed to it, and preparation of the pigment slurry whose solid content concentration is 70% was carried out to it. Thus, the styrene butadiene copolymer latex 10 section of a non-thickening mold and the hydroxy ethyl ether-ized starch 6 section were added to the obtained pigment slurry, water was added further, and coating liquid of 60% of solid content concentration was obtained.

[0034] The amount of coating per one side is the coating liquid of the above-mentioned [ stencil / above-mentioned ] 8 g/m<sup>2</sup> Double-sided coating was performed by the blade coating machine of a coating rate for 800m/, and it dried so that paper moisture might become 5.5%, so that it might become.

[0035] Subsequently, by the roll nominal diameter of 400mm, the metal roll temperature of 160 degrees C, Shore hardness 85 of an elastic roll, and a part for /and 650m linear pressure in \*\*\*\* rate 40 kg/cm, software nip calender processing was performed on condition that number of calender nips 2 nip, and lusterless coated paper was obtained.

[0036] Coated paper was obtained by the same approach as an example 1 except having used the report grade paper which contains talc for hydrated-Al-silicates soda (relative bulk density 0.4g/ml) 7% of the weight 3% of the weight per Shigekazu Kami as a [example 2] loading material, and contains mechanical pulp 11% of the weight as paper pulp as a coating stencil.

[0037] Coated paper was obtained by the same approach as an example 1 except having used the report grade paper which contains hydrated-Al-silicates soda (relative bulk density 0.4g/ml) 10% of the weight per Shigekazu Kami as a [example 3] loading material, and contains mechanical pulp 40% of the weight as paper pulp as a coating stencil.

[0038] Coated paper was obtained by the same approach as an example 1 except having used the report grade paper which contains the mechanical pulp which carried out 6 weight sections content and was obtained [ talc ] from newspaper recycled pulp as paper pulp 4% of the weight per Shigekazu Kami in hydrated-Al-silicates soda (relative bulk density 0.4g/ml) 30% of the weight as a [example 4] loading material as a coating stencil.

[0039] Nine weight sections content of the talc was carried out for hydrated-Al-silicates soda (relative bulk density 0.4g/ml) 1% of the weight per Shigekazu Kami as a [example 1 of comparison] loading material, and coated paper was obtained by the same approach as an example 1 except having used the report grade paper which contains mechanical pulp 15% of the weight as paper pulp as a coating stencil.

[0040] Coated paper was obtained by the same approach as an example 1 except having used the

report grade paper which contains hydrated-Al-silicates soda (relative bulk density 0.4g/ml) 13% of the weight per Shigekazu Kami as a [example 2 of comparison] loading material, and contains mechanical pulp 17% of the weight as paper pulp as a coating stencil.

[0041] Five weight sections content of the talc was carried out for hydrated-Al-silicates soda (relative bulk density 0.4g/ml) 5% of the weight per Shigekazu Kami as a [example 3 of comparison] loading material, and coated paper was obtained by the same approach as an example 1 except having used the report grade paper which contains mechanical pulp 8% of the weight as paper pulp as a coating stencil.

[0042] Ten weight sections content of the talc was carried out as a [example 4 of comparison] loading material, and coated paper was obtained by the same approach as an example 1 except having used the report grade paper which contains mechanical pulp 20% of the weight as paper pulp as a coating stencil.

[0043] Coated paper was obtained by the same approach as an example 1 except having changed the roll temperature of the software calender of the [example 5 of comparison] example 1 into 120 degrees C.

[0044] The above effectiveness was shown in a table 1.

[0045]

[A table 1]

表 1

	内添填料, %		機械パルプ	金属ロール温度	白紙光沢度	印面光沢度	密度	表面強度
	含水ケイ酸アルミニウム	タルク	%	°C	%	%	g/cm <sup>3</sup>	
実施例 1	4	6	30	160	26	53	1.02	◎
実施例 2	3	7	11	160	27	55	1.07	◎
実施例 3	10	0	40	160	28	60	0.93	○
実施例 4	4	6	30	160	22	46	1.04	○
比較例 1	1	9	15	160	26	54	1.10	◎
比較例 2	13	0	17	160	26	57	0.91	×
比較例 3	5	5	8	160	24	60	1.08	△
比較例 4	0	10	20	160	25	53	1.10	◎
比較例 5	4	6	30	120	18	42	1.00	◎

Examples 1-4 are low consistencies, its blank paper gloss is low, are high, and can obtain lusterless coated paper excellent in surface reinforcement so that clearly from a table 1. [ of stamp face gloss ] The example 1 of a comparison has a high consistency, and is not bulky. The example 2 of a comparison is inferior to surface reinforcement. The example 3 of a comparison is inferior to surface reinforcement. The example 4 of a comparison has a high consistency, and is not bulky. The example 5 of a comparison has low stamp face glossiness.

[0046]

[Effect of the Invention] By the configuration of this invention, a low consistency and stamp face glossiness are high, and lusterless coated paper excellent in surface reinforcement can be obtained efficiently.

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